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A standardized diagnostic approach and ongoing feedback improves outcome in psychogenic nonepileptic seizures

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ABSTRACT

Introduction: Psychogenic nonepileptic seizures (PNES) are episodic alterations in behavior presumed to reflect a physical manifestation of underlying psychological distress. Standardized treatment approaches for PNES care are lacking. We evaluated common approaches to PNES management that do not require significant commitment of time and resources.
Methodology: Patients with PNES established with video-EEG monitoring were randomized to one of the following three groups: 1) PNES diagnosis delivered per the discretion of the attending physician with advice to seek mental health assistance in the community ($n = 12$), 2) scripted PNES diagnosis provided and inpatient psychiatry consult obtained ($n = 10$), and 3) weekly follow-up phone calls made in addition to scripted diagnosis and inpatient psychiatry consultation ($n = 15$). Reduction in event frequency measured at 8 weeks following hospital discharge represented the primary outcome variable. Secondary variables analyzed included exploration of change in self-reported mood, quality of life, and healthcare utilization.
Results: No significant improvements were noted in patients simply given a PNES diagnosis and advised to seek outside care on any measure. In contrast, patients receiving a scripted diagnosis and psychiatric consultation demonstrated decreased PNES frequency accompanied by improved quality of life (QOL). Patients also receiving weekly phone calls not only demonstrated decreased PNES frequency and improvements in QOL but also exhibited improved mood.
Discussion: These findings demonstrate that providing diagnostic information regarding PNES is insufficient by itself to meaningfully affect patient outcome. Structured feedback and psychiatric consultation appeared adequate to significantly reduce PNES frequency and improve aspects of quality of life, while the addition of a weekly phone contact also led to improved mood.

1. Introduction

Psychogenic nonepileptic seizures (PNES) are episodic alterations in behavior that are presumed to reflect a physical manifestation of underlying psychological distress. Although PNES event clinically resemble epileptic seizures, EEG changes characteristic of epilepsy are lacking. Video-EEG monitoring remains the gold standard for the diagnosis of PNES.

The percentage of patients referred to epilepsy centers and subsequently diagnosed with PNES is high, ranging from 10 to 50% [1]. Higher estimates have been recently reported and have been attributed to differences in referral patterns, increased monitoring of patients with paroxysmal events, and possibly even increased PNES rates. Despite this high rate of occurrence, evidence-based strategies for PNES treatment are lacking. Significant variability exists in how the diagnosis of PNES is presented to patients based upon long-term video-EEG monitoring results. Follow-up care often involves either a formal mental health referral or a suggestion to the patient to seek such care. Finally, there are few professionals specializing in the care of patients with PNES with training and interest to optimally manage these patients [2]. While evidence suggests that cognitive behavioral therapy can be effective, these programs are limited to a few major university medical centers [3,4].

The effectiveness of a communication strategy for PNES has been reported to decrease PNES frequency [5–9]. For example, patients with PNES informed of their diagnosis using a structured protocol experienced fewer events over a short observational span, while those with epilepsy provided with diagnostic feedback showed no change in event frequency [5]. In another study, the use of a formal communication strategy led to decreased frequency in events at the group level, although there was no improvement in any self-report measures of psychological distress [6]. One study demonstrated that structured

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feedback and the use of a handout led to greater understanding and acceptance of a PNES diagnosis by patients [7].

While it appears that clear communication of the PNES diagnosis can at least contribute to a short-term reduction of episodes and healthcare utilization behaviors, the contribution of inpatient psychiatric consultation during hospitalization has not been characterized. Although this is a common approach used in tertiary care epilepsy centers, it is unclear if psychiatric consultation provides additional benefit as determined by episode frequency, mood, or quality of life. Furthermore, since patient contact provides the opportunity to reinforce the diagnosis, evaluate the patients' confidence in their diagnosis, and provide motivation to seek outpatient mental healthcare, follow-up telephone contact may provide the framework to improve PNES outcomes. This study evaluated the effectiveness of a standardized treatment approach including a communication script, inpatient psychiatry consultation, and distribution of written PNES educational materials with or without additional weekly phone follow-up versus an unscripted delivery of the diagnosis and suggestion to seek mental health services (standard practice).

2. Methods

2.1. Patients

All patients older than 18 years of age admitted to Emory University Hospital's Epilepsy Monitoring Unit for diagnostic evaluation of events of unclear etiology from July 2011 to May 2012 were eligible for the study. Of 92 patients admitted to Emory for a diagnostic evaluation who met inclusion and exclusion criteria during the enrollment period, 75 were recruited and provided informed consent. Patients were not considered for recruitment if they were admitted for characterization of known epilepsy or surgical evaluation. Patients who were diagnosed were also excluded if they were determined to have severe cognitive impairment or active homicidal or suicidal ideation.

Recruitment occurred prior to reaching a diagnostic conclusion in all cases in order to provide adequate time to explain the study to potential patients and for them to complete questionnaires. Additionally, this allowed us to assess mood and quality-of-life issues prior to the patient actually receiving any diagnostic information. Enrolled patients were later excluded if their monitoring stay was inconclusive ($n = 18$) or resulted in a diagnosis of epilepsy ($n = 6$), physiological NES (non-epileptic seizures: n = 3), or mixed epilepsy and PNES ($n = 2$) (see Fig. 1). This resulted in 46 enrolled patients receiving a diagnosis of PNES who could potentially be randomized to one of three treatment arms. Two patients with PNES were never randomized prior to hospital discharge. An additional 5 patients with PNES were randomized but later excluded from treatment either because of an inability to obtain a psychiatric consultation while in the hospital ($n = 3$) or because of the severity of their psychiatric comorbidities ($n = 2$), which were deemed severe enough to require immediate inpatient consultation. These occurrences, along with 2 additional patients being lost to follow-up over the course of the study, ultimately led to an uneven population of the three randomized groups. This study was approved by the investigation review board of Emory University.

Ultimately, 37 patients with PNES were enrolled and completed randomization and eight-week follow-up with the following distribution: Standard Practice = 12, Structured Inpatient Feedback = 10, and Structured Ongoing Feedback = 15. Baseline characteristics of patients completing the study are included in Table 1. Age was the only baseline variable to significantly differ between groups (Standard Practice = 45.3 years [$SD = 11.5$], Structured Inpatient Feedback = 37.7 years [$SD = 10.5$], and Structured Ongoing Feedback = 34.1 years [$SD = 9.5$], $p = 0.031$).

2.2. PNES classification and study randomization

To undergo randomization, patients had to receive a diagnosis of PNES based on recognized criteria including the absence of epileptiform activity during an episode and semiology characterized by (a) a definitive motor component (e.g., shaking or writhing of the torso or limbs, convulsive or rocking movements, head shaking) and/or (b) a discrete episode of unresponsiveness and (c) the clinical impression that the event could not be explained by another physiological cause (e.g., syncope, sleep disturbance). Once diagnosed, patients were assigned to one of three treatment groups using a preset randomization chart that was based on computer generation of random numbers (simple randomization). Fig. 1 depicts the study flow.

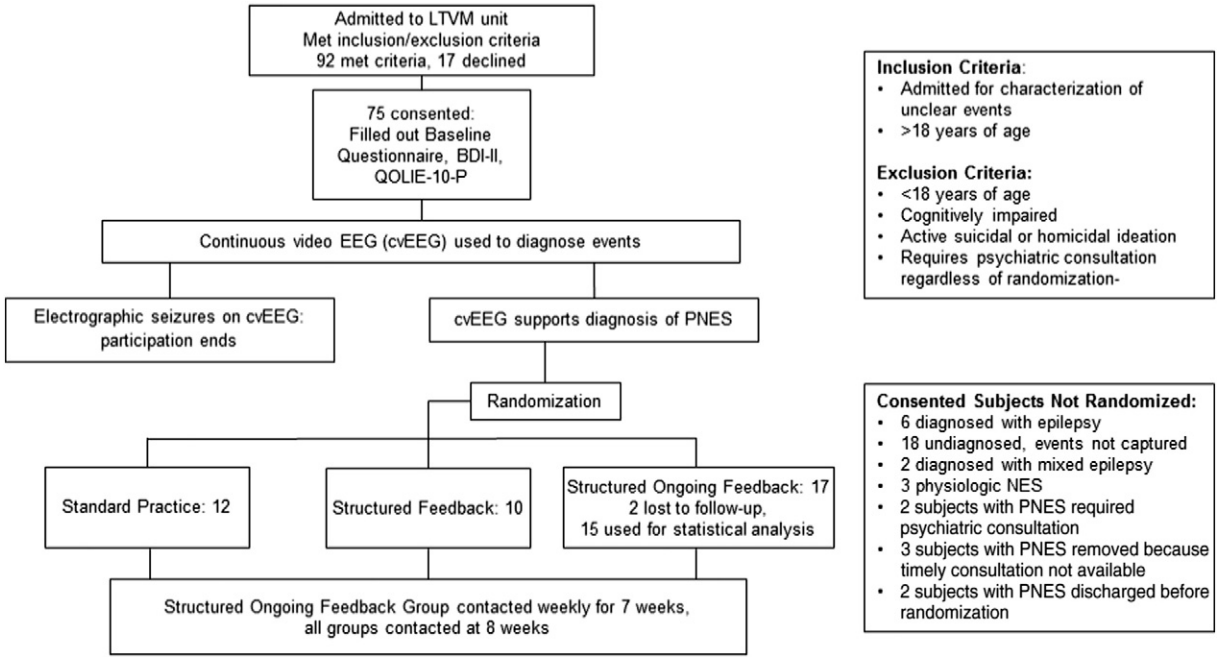

Fig. 1. Study flow and participation.

Table 1
Baseline characteristics.

	Standard Practice	Structured Feedback	Structured Ongoing Feedback	*p* value[a]
	$n = 12$	$n = 10$	$n = 15$	
Age (years)	45.3 ± 11.5	37.7 ± 10.5	34.1 ± 9.5	0.031
Gender	10 females/2 males	7 females/3 males	13 females/2 males	NS
Education (years)[b]	13.3 ± 2.5	14.0 ± 3.4	13.9 ± 3.1	NS
Age at event onset (years)[b]	38.1 ± 13.5	32.0 ± 9.2	31.5 ± 11.0	NS
# of current AEDs[b]	2.1 ± 1.1	1.4 ± 1.3	1.3 ± 0.8	NS
History of abuse[c]	7	2	6	NS
Mood disturbance[d]	12	8	14	NS
History of psychiatric treatment	6	7	6	NS
Event frequency[e]	3.2 ± 1.1	2.9 ± 0.9	2.9 ± 0.9	NS
BDI-II	25.9 ± 14.5	22.7 ± 11.0	23.7 ± 13.0	NS
QOLIE-10-P	34.3 ± 6.6	33.6 ± 5.5	34.7 ± 3.8	NS

Note. AEDs = antiepileptic drugs; BDI-II = Beck Depression Inventory (2nd edition); QOLIE-10-P = Patient-weighted Quality-of-Life-in-Epilepsy Inventory — 10-item Version.
[a] Noted if $p < 0.05$. NS = not significant.
[b] One patient in the Structured Feedback group did not self-report. Therefore, $n = 9$ for this analysis.
[c] Sexual, physical, or emotional.
[d] Depression, anxiety, or mood swings.
[e] Number of events in the last month divided into the following groups: 1 = 0 events, 2 = 1–5 events, 3 = 6–10 events, and 4 = more than 10 events.

2.3. Baseline assessment

All consenting patients completed three questionnaires at the beginning of long-term video-EEG monitoring: a baseline questionnaire that established demographics and event frequency, the 2nd edition of the Beck Depression Inventory (BDI-II) [10], and the patient-weighted Quality-of-Life-in-Epilepsy — 10 survey (QOLIE-10-P) [11].

2.4. Treatments

Patients were randomized to one of the following three groups:

2.4.1. Standard Practice

The attending physician presented the PNES diagnosis at his/her own discretion (without a script) and suggested mental health follow-up in the community. These patients did not receive an inpatient psychiatric consultation or educational materials, and the study team did not contact them until eight weeks after discharge.

2.4.2. Structured Inpatient Feedback

Patients were given a diagnosis of PNES using a standardized script created by the study team and also underwent inpatient psychiatric consultation (see Fig. 2 for the standardized script). Patients also received an educational handout about PNES, developed at Emory University, which included contact information for follow-up with the Emory Psychiatry Department. The psychiatric evaluation occurred in the hospital setting and consisted of an initial detailed clinical interview conducted by a resident psychiatrist followed by a briefer, focused evaluation by the inpatient psychiatry team, which included the attending psychiatrist, the resident psychiatrist, and medical students. The patient typically received another presentation of the diagnosis by these professionals and were usually advised to seek follow-up mental health services in their local community.

2.4.3. Structured Ongoing Feedback

Patients not only received the scripted PNES diagnosis, inpatient psychiatric consultation, and educational handout but were also

Scripted Diagnosis Discussion & Checklist

___Your events or spells were seen on video EEG. The EEG revealed that your seizures are not epileptic seizures.

___Events without EEG findings of an epileptic seizure are called non-epileptic seizures. They are also called: non-epileptic attacks or non-epileptic spells. Some doctors have also used the terms pseudo-seizures, or psychogenic spells although this does not mean that your events are not real, only that they are not epileptic seizures.

___You do not have epilepsy.

___Epilepsy medications will not help your spells. We recommend not taking epilepsy medications to stop these events.

___Non-epileptic spells are thought to be due to underlying stress or a reaction to a stressful situation. The stressful situation can be something that is going on currently or even something in the remote past, maybe even as far back as childhood.

___Studies have shown that psychological treatment can help you cope with the anxiety or stress and discover what stress may be causing your spells. This is the only treatment that has been shown to help stop your events.

___It is important that you see a mental health provider in your area.

___Some patients' non-epileptic seizures stop after diagnosis. Others need the help of a mental health provider, such as a psychologist, psychiatrist, or counselor.

Fig. 2. Scripted diagnosis discussion as employed in study.

contacted on a weekly basis by phone to follow up on whether they had established a relationship with a mental health provider and to inquire about their level of confidence as to whether their events will stop. Weekly phone surveys were based on motivation and confidence questions used to create the online self-assessment tool called WebEASE (Web Epilepsy, Awareness, Support, and Education) [12]. All phone calls were made by a medical resident.

The WebEASE materials, while both validated and published, were designed to evaluate self-management and medical compliance in patients with epilepsy. As standardized materials for the assessment of PNES compliance and self-management do not exist yet, we felt that the similarities between patient populations made the epilepsy self-management tools a reasonable option. However, we only used sections that were appropriate. For example, we did not use the section on medication compliance. Patients were asked how motivated they were to see a mental health provider on a numerical scale of 1 to 10 (1 = not motivated at all, 10 = highly motivated) and how confident they were that their events would stop (1 = not confident at all, 10 = very confident). Motivational phrases were then used depending on the answer. The importance of follow-up with a mental health provider was reinforced, and patients were provided with the Emory Psychiatry Department phone number if they could not locate this information. The medical resident making the follow-up calls could also refer to the structured diagnostic feedback worksheet as needed to respond to patient questions as appropriate (see Fig. 2). The modified WebEASE materials are included as an online appendix, with portions that were not appropriate to the current study population excluded (see online Appendix A).

2.5. Postdiagnostic assessment

At discharge, all randomized patients completed a postdiagnosis survey assessing their understanding of the diagnosis and whether they planned to see a mental health provider or seek a second opinion.

At eight weeks following hospital discharge, patients in all groups were called to determine their event frequency. Patients also completed the BDI-II and QOLIE-10 questionnaires via phone call. Healthcare utilization was also evaluated, specifically whether a patient was evaluated by a mental health provider, sought a second opinion, visited an emergency department, or was admitted to a hospital for ongoing PNES event. Patients were also asked if they understood their diagnosis and believed their events would stop.

The primary outcome measure of the study was PNES frequency. For comparative analysis, PNES frequency was defined as episodes occurring in the past month and broken down into the following categories: level 1 = 0 events, level 2 = 1–5 events, level 3 = 6–10 events, and level 4 = more than 10 events.

Secondary outcome measures included changes in BDI-II and QOLIE-10-P total scores. Power analysis suggested a sample of at least 23 patients per group in order to detect a statistically significant difference in event frequency at eight weeks. While we were unable to achieve this enrollment goal, our findings nevertheless achieved statistical significance.

Data were analyzed using SPSS version 21. Baseline comparisons of disease-related and demographic variables were completed using analysis of variance for numerical variables and Fisher's exact test for categorical variables. Because of power considerations resulting from the sample size of patients completing the baseline and follow-up protocols, paired-sample t-tests were used to determine statistical significance in each patient group.

3. Results

3.1. Change in frequency of PNES

There was a statistically significant decrease in the average event frequency category at eight-week follow-up for patients who received inpatient psychiatric consultation (Structured Inpatient Feedback: 2.9 [$SD = 0.9$] vs. 1.7 [$SD = 0.5$], $p = 0.005$, Structured Ongoing Feedback: 2.9 [$SD = 0.9$] vs. 1.7 [$SD = 0.6$], $p = 0.001$) (Table 2). However, the group with PNES receiving standard care did not exhibit a significant decline in event frequency over the 8-week span: 3.2 [$SD = 1.1$] vs. 2.5 [$SD = 1.0$].

3.2. Change in mood and quality of life

Statistically significant improvement was observed in average QOLIE-10-P scores in the Structured Feedback (improved from 19.4 [$SD = 5.9$] to 33.6 [$SD = 5.5$], $p < 0.001$) and Structured Ongoing Feedback groups

Table 2
Outcome measurements at baseline vs. 8 weeks.

	Standard Practice ($n = 12$)			Structured Feedback ($n = 10$)			Structured Ongoing Feedback ($n = 15$)		
	M (*SD*)	*p* value[a]	Eta[2]	*M* (*SD*)	*p* value[a]	Eta[2]	*M* (*SD*)	*p* value[a]	Eta[2]
Event frequency[b]									
Baseline	3.2 (1.1)			2.9 (0.9)			2.9 (0.9)		
8 weeks	2.5 (1.0)	NS		1.7 (0.5)	0.005		1.7 (0.6)	0.001	
BDI-II									
Baseline	25.9 (14.5)			22.7 (11.0)			23.7 (13.0)		
8 weeks	25.1 (14.0)	NS	0.10	18.8 (9.7)	NS	0.24	15.5 (9.6)	<0.001	0.64
QOLIE-10-P									
Baseline	34.3 (6.6)			33.6 (5.5)			34.7 (3.8)		
8 weeks	31.0 (5.8)	NS	0.29	19.4 (5.9)	<0.001	0.80	21.7 (6.8)	<0.001	0.87
QOLIE #4 + 5[c]									
Baseline	6.7 (3.4)			7.7 (2.0)			7.0 (2.6)		
8 weeks	5.2 (2.9)	NS	0.15	4.0 (2.2)	0.001	0.75	5.8 (2.4)	NS	0.09
QOLIE #9[d]									
Baseline	3.4 (0.8)			3.2 (1.0)			3.3 (1.0)		
8 weeks	2.4 (1.2)	0.02	0.40	2.5 (0.9)	NS	0.29	2.4 (1.1)	0.027	0.30

Note: BDI-II = Beck Depression Inventory (2nd Edition); QOLIE-10-P = Patient-weighted Quality-of-Life-in-Epilepsy Inventory — 10-item Version.

[a] Noted if $p < .050$. NS = not significant.

[b] See Table 1 for event frequency categories. Because patients were not self-reporting, for this analysis: Standard Practice $n = 11$, Structured Feedback $n = 9$, and Structured Ongoing Feedback $n = 15$.

[c] Questions 4 and 5 address work and social limitations. A summed higher score is worse.

[d] Question 9 assesses fear of having a seizure in the next 4 weeks.

(improved from 21.7 [$SD = 6.8$] to 34.7 [$SD = 3.8$], $p < 0.001$). There was a statistically significant decline in the average BDI-II score for the Structured Ongoing Feedback group only (scores declined from 23.7 [$SD = 13.0$] to 15.5 [$SD = 9.6$], $p < 0.001$), with lower scores reflecting a more positive mood.

Individual QOLIE-10-P questions were also analyzed. There was a significant difference among patient groups in two of the QOLIE-10-P subscores. Questions four and five address social and work limitations, with a higher summed score indicating greater perceived limitations. Patients receiving psychiatric consultation and structured diagnostic feedback experienced a statistically significant improvement in this subscore (Structured Inpatient Feedback: improved from 7.7 [$SD = 2.0$] to 4.6 [$SD = 2.0$], $p = 0.003$, Structured Ongoing Feedback: improved from 7.0 [$SD = 2.6$] to 4.1 [$SD = 1.8$], $p < 0.001$). Question nine assesses fear of having a seizure over the next four weeks. Significant improvements in this subscore were seen in the Standard Inpatient Practice (improved from 3.4 [$SD = 0.8$] to 2.4 [$SD = 1.2$], $p = 0.020$) and Structured Ongoing Feedback groups (improved from 3.3 [$SD = 1.0$] to 2.4 [$SD = 1.1$], $p = 0.027$).

3.3. Change in healthcare utilization

Results from the postdiagnosis survey were compared to similar questions asked at eight-week follow-up (Table 3). Not all patients completed the postdiagnosis survey prior to discharge (Standard Practice = 8, Structured Inpatient Feedback = 8, and Structured Ongoing Feedback = 13), and therefore, comparative statistical analyses were not performed. However, fewer patients in the groups receiving psychiatric consultation sought a second opinion for their diagnosis, and fewer patients in the Standard Practice group saw a mental health provider.

Weekly phone surveys for patients in the Structured Ongoing Feedback group proved difficult to perform because of inconsistency in ability to contact patients and lack of patient interest in participating in weekly calls. The average number of weekly surveys completed per patient was three. There was no significant change in motivation or confidence scale scores for patients who completed all seven surveys.

Healthcare utilization for uncontrolled events did not differ across groups at the eight-week follow-up. One patient from the Standard Practice group visited an emergency department for PNES evaluation, and one patient from the Structured Ongoing Feedback group was admitted to a hospital for observation following a PNES episode.

Table 3
Healthcare utilization at discharge vs. 8 weeks.

	Standard Practice	Structured Feedback	Structured Ongoing Feedback
	$n = 8$[a]	$n = 8$	$n = 14$
"I understand diagnosis"			
Discharge	6	7	9
8 weeks	8	8	12
Second opinion			
Discharge — "I plan to seek a second opinion"	3	4	1
8 weeks — "I sought a second opinion"	3	0	1
"My events will stop"			
Discharge	6	4	10
8 weeks	6	8	12
Mental health provider			
Discharge — "I plan to see a provider"	8	8	13
8 weeks — "I saw a provider"	3	6	10

[a] The table compares survey answers for patients who completed both the postdiagnosis survey and the 8-week survey.

4. Discussion

This study indicates that a standardized approach to presenting PNES diagnosis improves outcomes, with further improvement in secondary variables from ongoing patient contact. Conveying the diagnosis with a communication protocol, inpatient psychiatric consultation, and educational handouts can decrease event frequency and improve quality-of-life measures. Weekly, motivational phone contact is also associated with improved mood. Overall, this study suggests that patients with PNES fare better across a variety of outcome parameters when they are provided with diagnostic feedback that is clear and structured.

This study was designed to examine whether interventions emphasizing communication at the time of diagnosis and need for mental health follow-up could positively affect a number of outcome measures in the population with PNES. This study did not examine the effects of cognitive behavioral therapy (CBT). Although formal treatment programs involving CBT appear promising based on a handful of preliminary studies [4], such programs are not available in most communities (i.e., at present, formal treatment programs tend to exist only at academic medical centers where they are being studied). In addition to the scarcity of formal treatment programs for PNES, these programs require a significant commitment of time and financial resources, as well as the ability to travel to the treatment provider. Therefore, simple intervention strategies that could be implemented fairly easily without a large commitment of resources (e.g., using a structured method of delivering the PNES diagnosis, giving the patient a handout to reinforce the diagnosis, and using an inpatient psychiatry consultation to reinforce the diagnosis) are likely to provide benefit to a larger percentage of patients with PNES and may be helpful while they are awaiting more formal treatment options.

The intent of weekly phone calls was to reinforce the diagnosis of PNES to the patient, to provide brief emotional support, and to facilitate successful engagement with available community mental health resources. The patients receiving such feedback (Structured Ongoing Feedback group) represented the only group to demonstrate an improvement in mood. Nevertheless, it is at times difficult to reach patients by phone, and some patients reported that they were bothered by repetitively completing the outcome measures. In future studies, it may be helpful to provide structured support and diagnostic reinforcement without any attempt to track outcome until the final follow-up date.

The group not receiving structured feedback was the least likely to seek mental health assistance upon hospital discharge. Thirty-seven percent of the Standard Practice group had sought mental health assistance at 8-week follow-up, as compared to over 76% of the Structured Feedback groups. This suggests that the structured feedback and psychiatric consultation provided by the structured follow-up methods provide enhanced reinforcement of the diagnostic message, which may contribute to greater patient acceptance. In turn, greater diagnostic acceptance and reminders about mental health options in the community may lead to these better rates of treatment engagement. Finally, gains in event reduction and quality of life could, in part, result from greater mental health engagement following hospital discharge.

One limitation of this study was the use of multiple treatment components within each group. It is difficult to definitively attribute outcome gains to any single intervention. For example, it remains unclear whether the psychiatric consult or the use of a structured diagnostic feedback session and the provision of a formal handout are superior to one another with regard to short-term reduction of event occurrence. All of these interventions have in common the theme of reinforcing the diagnostic conclusion in a systematic, consistent manner. As the cost of these interventions varies, future studies should look at these individual components more systematically in order to find the most resource-efficient method of intervention.

Another limitation was that our study did not evaluate long-term outcome beyond the eight-week postdischarge period. It is uncertain

if the groups' event frequencies, BDI-II scores, and QOLIE-10-P scores will change at six months or one year. We anticipate that healthcare utilization and understanding of the diagnosis may change over time as well. Further longitudinal studies are needed to address these issues.

Despite these limitations, our study supports that a standardized communication protocol can reduce event frequency [5–9]. It also suggests that a standardized approach to the treatment of PNES might benefit from inclusion of an inpatient psychiatric consultation, educational handouts, and phone follow-up to ensure that patients are doing well and seeing a mental health provider. The added value of psychiatric consultation alone needs to be determined in future studies, as this intervention has a greater cost component associated with it. Overall, most epilepsy centers will have the resources to attempt one or more of these structured feedback interventions, which may contribute to better acceptance of the PNES diagnosis, a greater likelihood to seek formal mental health intervention, a reduction in PNES event, and improvements in QOL.

Conflict of interest

None of the authors of this paper have any conflicts of interest to report with regards to this publication.

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